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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/031,617	02/27/1998	DAVID A. CATHEY	11675.23	8864
22901	7590	11/06/2003	EXAMINER	
GREGORY M. TAYLOR WORKMAN, NYDEGGER & SEELEY 1000 EAGLE GATE TOWER 60 EAST SOUTH TEMPLE SALT LAKE CITY, UT 84111			WILCZEWSKI, MARY A	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/031,617

Applicant(s)

CATHEY ET AL.

Examiner

Mary Wilczewski

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 0200 and 18 July 2000.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 30-36 is/are pending in the application.
- 4a) Of the above claim(s) 17-25 and 34-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 31-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 1998 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

Election/Restrictions

Applicant's election without traverse of the species 1, claims 1-15 and 31-33, in Paper No. 16 is acknowledged. Since no arguments have been presented traversing the restriction requirement, this election is deemed without traverse.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art disclosed on pages 5-6 of the application in view of Sukharev, U.S. Patent 5,710,079, of record.

The admitted prior art shown in Figure 2 of the application and disclosed on pages 5-6 disclose a convention method of forming contacts and vias having a diffusion barrier comprising the steps of forming a discrete region 34, forming an oxide layer 36 covering the discrete region and etching a contact opening through the oxide layer to expose the discrete region, and depositing a barrier layer to cover the surface of the discrete region, wherein the source gas comprises an organometallic compound, metallizing the contact opening with a metallization material. The barrier layer functions as a diffusion barrier to prevent the metallization material from contacting the discrete region and the barrier layer comprises a metal oxide selected from the group

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consisting of a conductive metal oxide, a Ru oxide film, and an aluminum oxide film. It is further disclosed that the source gas is selected from the group consisting of aluminum trimethane, titanium tetramethane, a vaporized tantalum in the form of an organometallic compound, trimethyl aluminum hydrate, a Ru metalorganic precursor, and dimethyl aluminum hydrate and is reacted with diatomic oxygen to deposit the barrier layer. The prior art lacks anticipation only of reacting the source gas with ozone.

Sukharev discloses a method of depositing dielectric and metallic films by reacting an organometallic source gas with ozone. Although the preferred embodiment of Sukharev is directed to the deposition of dielectric layers, Sukharev expressly discloses that the disclosed method can be used to deposit films of tungsten, titanium, tantalum and silicides and that the hydroxyl mediated decomposition reaction of his invention can be employed to accelerate the rate at which any number of organometallic compounds are reacted to form deposition layers in CVD reactors, see column 8, lines 20-38. Admittedly, Sukharev does not expressly teach that metal oxide layers can be deposited by his method. However, the test for obviousness is not whether the features of the secondary reference can be bodily incorporated into the method of the primary reference nor is it that the claimed invention must be expressly suggested in any one or all of the applied references. Rather, the test for obviousness is what the combined teachings would have suggested to those skilled in the art. In this case, Sukharev clearly teaches that the use of ozone with organometallic gases in the chemical vapor deposition of either dielectric or conductive layers causes the organometallic compound

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to decompose at an accelerated rate when the ozone molecules are caused to decompose into atomic oxygen, since atomic oxygen is highly reactive with water and forms hydroxyl radicals which are known to react with organic compound nine orders of magnitude faster than ozone. Moreover, Sukharev is not merely limited to what the reference expressly teaches, rather, the entire disclosure must be considered, including inferences therefrom and unpreferred embodiments. Applicant's arguments presented on July 18, 2000, have been considered, but are not deemed persuasive. Applicants have argued that Sukharev neither teaches or nor suggests that his disclosed process will work effectively with organometallic compounds that contain a metal such as Al, Ti, Ta, Ru. Sukharev clearly teaches in column 8, lines 20-38 that the disclosed method *work with any number of organometallic compounds*, including those used to deposit conductive layers. Sukharev need not expressly teach the metal oxide layers taught in the admitted prior art to be properly combined with Applicant's admitted prior art. Sukharev clearly teaches the role of ozone in the deposition of conductive layers by CVD. It is clearly taught that the ozone makes it possible to decompose the organometallic compound at a faster rate, thereby speeding up the rate of deposition of the deposited film. This teaching provides motivation for one of ordinary skill in the art to use ozone in the admitted prior art process disclosed by Applicant. Hence, it is deemed that the present claims do not patentably distinguish the claimed method from that of the admitted prior art in light of the teachings of Sukharev.

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Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication should be directed to M. Wilczewski at telephone number (703) 308-2771.



M. Wilczewski
Primary Examiner
Tech Center 2800